

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

## CLAIMS

1. A method for compressing binarized images comprising:

receiving a binarized image and generating a first sequence of first code symbols representing the binarized image wherein at least one row of the image is represented in run-length encoded format; and

encoding a portion of the first sequence of code symbols using a preliminary encoding scheme, thereby to provide a first portion of a second sequence of code symbols, and, while encoding, accumulating the frequency of at least some of the first code symbols thus far encoded and generating an additional portion of the second sequence using a modified version of the code scheme such that at least one subsequent code symbol in the first sequence with a large accumulated frequency is encoded more compactly in the second portion than at least one subsequent code symbol in the first sequence with a small accumulated frequency.

2. A method according to claim 1 wherein a modified Huffman coding scheme is employed to generate the first sequence of first code symbols.

3. A method for compressing binarized images comprising:

receiving a binarized image and generating a first sequence of first code symbols representing the binarized image comprising a representation of one row of the binarized image and a representation of differences between at least one subsequent row and at least one previous row; and

encoding a portion of the first sequence of code symbols using a preliminary encoding scheme, thereby to provide a first portion of a second sequence of code

symbols, and, while encoding, accumulating the frequency of at least some of the first code symbols thus far encoded and generating an additional portion of the second sequence using a modified version of the code scheme such that at least one subsequent code symbol in the first sequence with a large accumulated frequency is encoded more compactly in the second portion than at least one subsequent code symbol in the first sequence with a small accumulated frequency.

4. A method according to any of claims 1 - 3 wherein the encoding scheme used to encode the first sequence of code symbols is continually modified such that code symbols in the first sequence with a large accumulated frequency are encoded more compactly in the second portion than subsequent code symbols in the first sequence with a small accumulated frequency.

5. A method according to any of the preceding claims wherein a modified-read coding scheme is employed to generate the first sequence of first code symbols.

6. A method according to any of the preceding claims 1 - 4 wherein a modified modified-read coding scheme is employed to generate the first sequence of first code symbols.

7. A method according to any of the preceding claims and also comprising binarizing a discrete level image, thereby to provide the binarized image.

8. A method according to any of the preceding claims 1 - 6 and also comprising binarizing a continuous level image, thereby to provide the binarized image.

9. A method according to any of the preceding

claims wherein arithmetic coding is employed to translate the accumulated frequency of at least some of the first code symbols into second code symbols.

10. Apparatus for compressing binarized images comprising:

a run-length encoder operative to receive a binarized image and to generate a first sequence of first code symbols representing the binarized image wherein at least one row of the image is represented in run-length encoded format; and

an adaptive encoder operative to encode a portion of the first sequence of code symbols using a preliminary encoding scheme, thereby to provide a first portion of a second sequence of code symbols, and, while encoding, to accumulate the frequency of at least some of the first code symbols thus far encoded and to generate an additional portion of the second sequence using a modified version of the code scheme such that at least one subsequent code symbol in the first sequence with a large accumulated frequency is encoded more compactly in the second portion than at least one subsequent code symbol in the first sequence with a small accumulated frequency.

11. Apparatus for compressing binarized images comprising:

a binarized image compressor operative to receive a binarized image and to generate a first sequence of first code symbols representing the binarized image, the first sequence comprising a representation of one row of the binarized image and a representation of differences between at least one subsequent row and at least one previous row; and

an adaptive encoder operative to encode a portion of the first sequence of code symbols using a

preliminary encoding scheme, thereby to provide a first portion of a second sequence of code symbols, and, while encoding, to accumulate the frequency of at least some of the first code symbols thus far encoded and to generate an additional portion of the second sequence using a modified version of the code scheme such that at least one subsequent code symbol in the first sequence with a large accumulated frequency is encoded more compactly in the second portion than at least one subsequent code symbol in the first sequence with a small accumulated frequency.

12. Apparatus according to any of the preceding claims 10 - 11 wherein the binarized image compressor employs a modified-read coding scheme to generate the first sequence of first code symbols.

13. Apparatus according to any of the preceding claims 10 - 11 wherein the binarized image compressor employs a modified modified-read coding scheme to generate the first sequence of first code symbols.

14. Apparatus according to any of the preceding claims 10 - 13 wherein the adaptive encoder employs arithmetic coding to translate the accumulated frequency of at least some of the first code symbols into second code symbols.

15. Apparatus according to any of claims 10 - 14 wherein the encoding scheme used to encode the first sequence of code symbols is continually modified such that code symbols in the first sequence with a large accumulated frequency are encoded more compactly in the second portion than subsequent code symbols in the first sequence with a small accumulated frequency.